

DIFFERENTIAL RELIANCE ON THE CAUSAL CORE CONCEPT IN THE DOMAIN OF PHYSICS AND BIOLOGY

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THEORETICAL BACKGROUND

- Children develop core concepts very early
- Despite considerable education, adults do not completely abandon those naïve concepts
- Dispositional theories of causality model causation as an antagonistic interaction between agent- and patient-objects (living as well as inert) with intrinsic dispositions¹:
 - Ontological distinction between “agents” and “patients”
 - Asymmetric attribution of agency: agent acts and is viewed as the cause, whereas patient is acted upon and is the locus of effect²
 - Impact of forces asymmetrically perceived: agent is stronger than patient³
- Language expresses causal asymmetry⁴
- Adhering to ideas of dispositional causality effects
 - Implicit ascription of specific features to the interacting objects
 - The view that properties are transferred from the agent to the patient³
- This influences the probability that an event is interpreted as including a causal relation

Research question

- Do adults and children cross-domainly adopt an agent-patient relationship when judging a collision event with two inert objects as well as a sting event with two living objects?

Based on theoretical insights and the status quo of research, we hypothesize that:

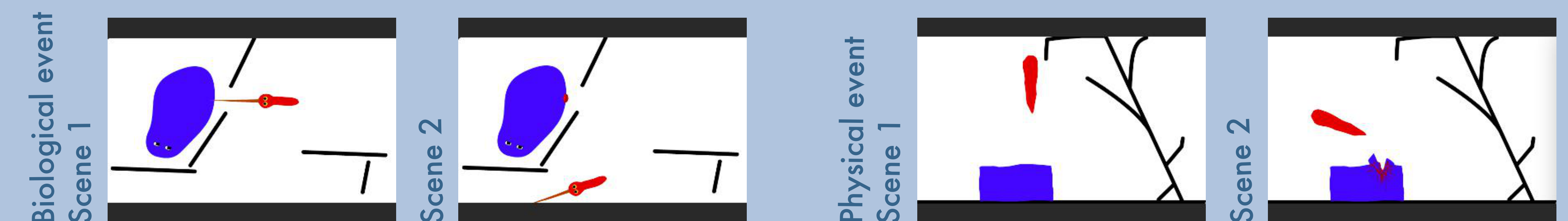
- Interactions of inert as well as living objects are interpreted as involving causal dispositions (i.e. goal-directed agent-like causes and interaction-roles)
- Individuals will judge statements as true or false according to their naïve concept
- Adults will implicitly give similar naïve answers as children will explicitly

References

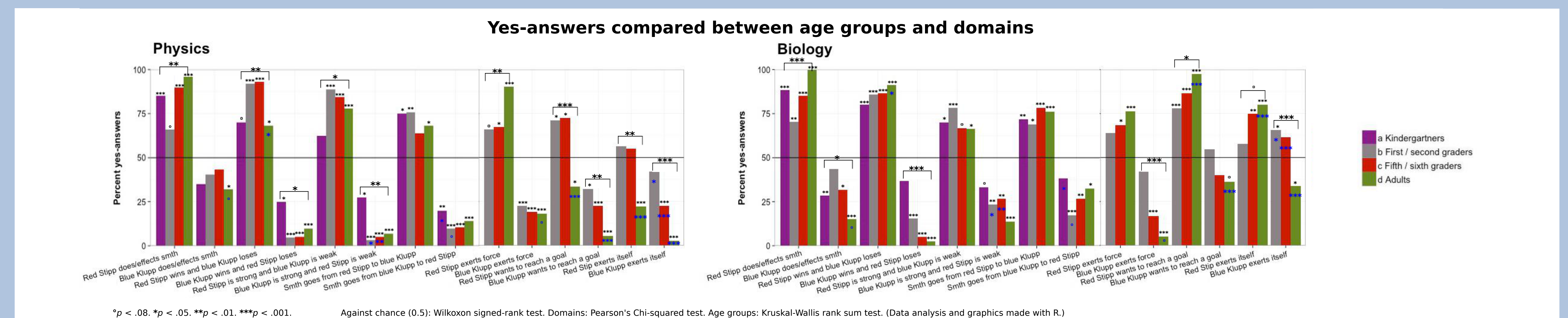
- ¹Mayrhofer, R., & Waldmann, M. R. (2015). Agents and causes: Dispositional intuitions as a guide to causal structure. *Cognitive Science*, 39(1), 65-69.
²White, P. A. (2006). The causal asymmetry. *Psychological Review*, 113, 132-147.
³White, P. A. (2009). Property transmission: An explanatory account of the role of similarity information in causal inference. *Psychological Bulletin*, 135, 774-793.
⁴Talmy, L. (1988). Force dynamics in language. *Cognitive Science*, 12, 49-100.

METHODS

- A sample of 50 kindergartners (age $M = 6$, $SD = .49$), 63 first / second graders (age $M = 7.32$, $SD = .47$), 59 fifth / sixth graders (age $M = 11.56$, $SD = .73$) and 76 lay adults (age $M = 23.72$, $SD = 5.73$) were tested
- Participants watched a biological or a physical event
- Then, they heard 14 sentence pairs and judged them as right or wrong
- Adults additionally experienced time pressure



RESULTS



DISCUSSION

- Across the domains, participants categorised the two objects into agent and patient roles with corresponding attributes
- Under time pressure, adults judged the statements similar to children - suggesting that naïve concepts are never fully abandoned

Findings indicate that children, as well as adults under time pressure, use dispositional causal concepts when interpreting a physical collision event and a biological sting event. Moreover, the tendency to adopt a dispositional stance increases with age, particularly noticeable in the biological domain.

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